

4Kp60 HDR Decoder & IPTV Receiver with HDMI & CVBS Out



h.265 and h.264 compatible Decoder & IP Receiver with Transcoding feature

- Inputs: 1x UHD/HD/SD in h.264 or h.265 compatible streams like from our SoC boxed Encoders HDE and SDE family
- Outputs HDMI, CVBS in parallel
- Stereo Audio embedded decoding of AC3, AAC and MP1L2, external Audio Output (3.5mm Stereo)
- UHD Resolution max 2160p60, 1080p, 720p....
- IP Input and Transcoding Output Protocols: RTSP/RTP/UDP, UDP/RTP, HTTP, adaptive HLS, FLV, RTMP(s), SRT
- MPTS Input with Program selection for decoding
- Reception of Video Camera UHD/HD streams and other source content over LAN or WAN, ONVIF detection support
- Inserting of Text, Logos and scrolling Text as Overlays
- Video-over IP applications (Signal distribution)
- Digital Signage applications
- Video conferencing, Camera streaming
- IPTV on LAN applications, Corporate IPTV for Broadcasters
- UHD/HD Transcoding in HD, Upscaling to HDMI out
- Remote management by an inbuilt Webserver-Interface

The BLANKOM HDD-276 decoder serves the distribution of Full-HD and UHD TV/Video content through IP networks in digital quality.

The live Video can be received by this decoder as an IP stream and displays it on to standard TV sets. Remote configuration by Web-Interface for perfect handling in Digital Signage networks.

BLANKOM HDD-276

IPTV Decoder is designed for TV signal reception in excellent quality over LAN and WAN.

The h.265 (HEVC) and h.264 compatible codec technology featuring low-latency and low bit rates for IPTV system and Digital Signage reception. The high-efficient decoding chip saves bandwidth cost through all its resolution range.

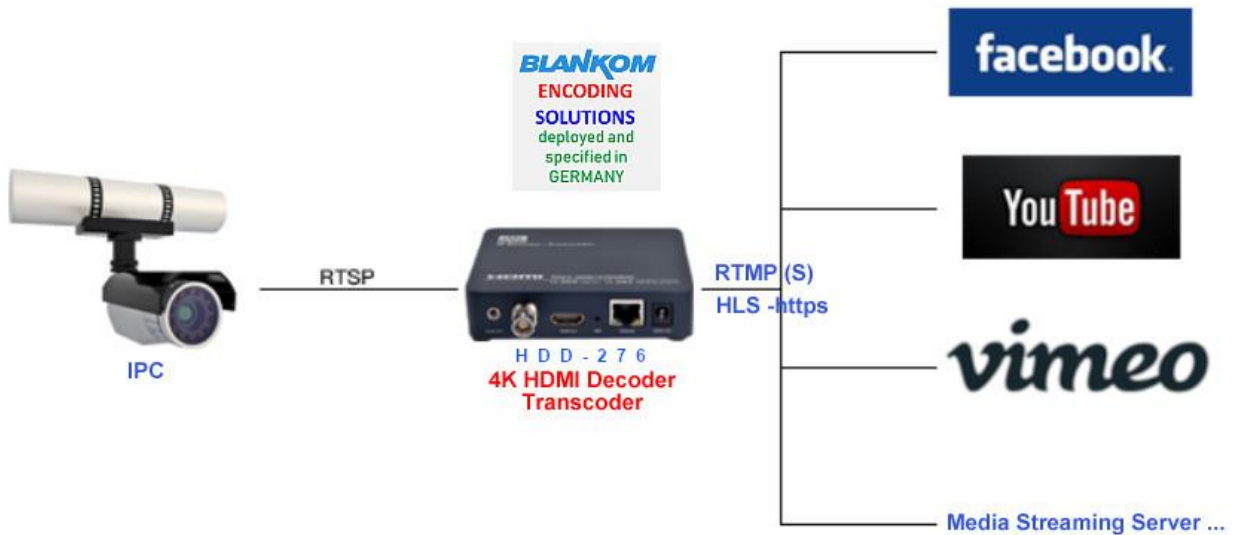
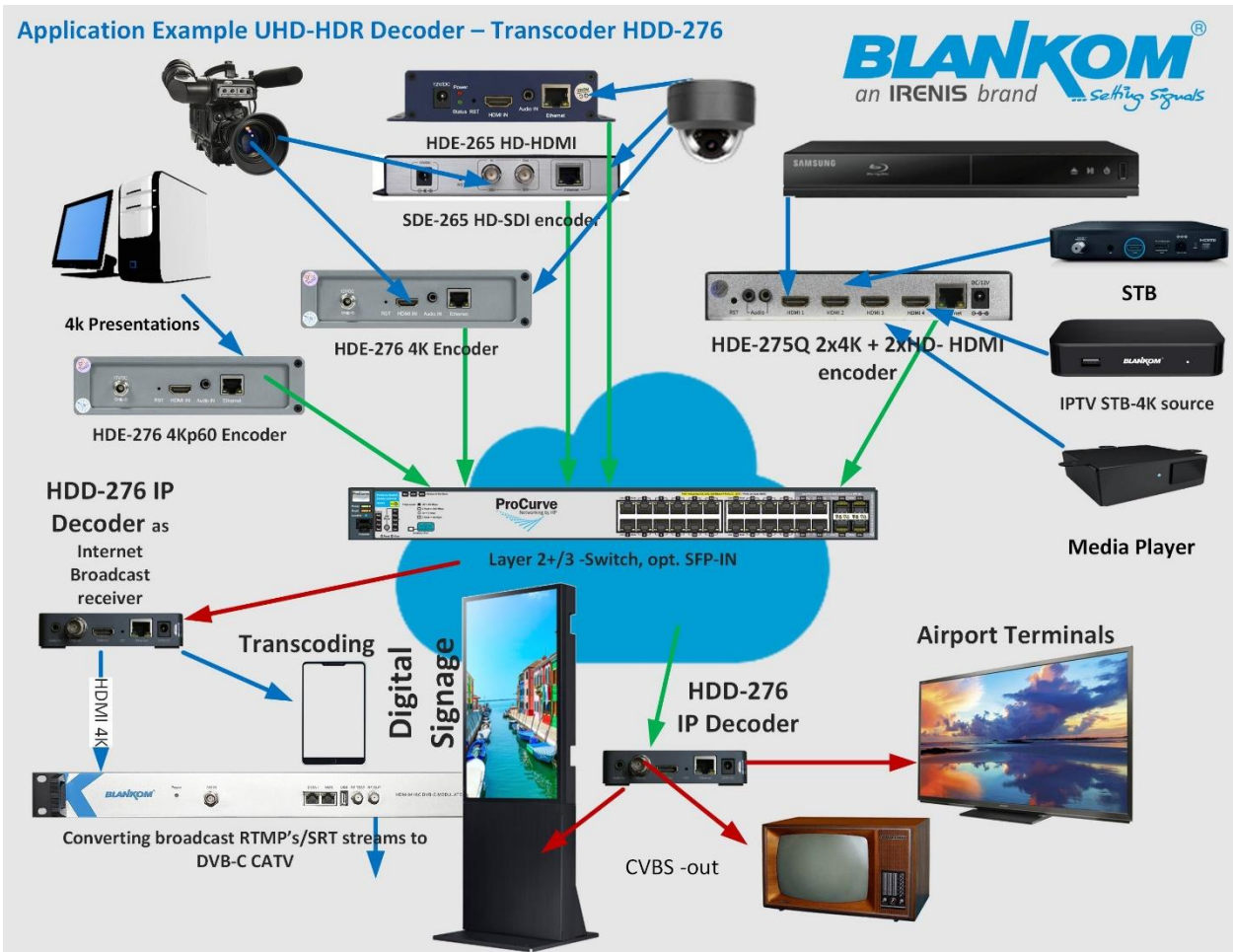
Reception of SD, HD and UHD HDR Video streams through the IPTV/OTT network using state-of-art IP technology from almost any kind of video input.

Transcoding the Input stream by keeping or changing codec to HD. Upscaling to HDMI output supported.

Excellent Video and Audio quality. High reliability. Web-Interface.

No regular service and maintenance need during operation.

Application Example



Technical Specifications:

Function	4Kp60 h.265 (HEVC compatible) and h.264 (MPEG4 compatible) Decoder with HDR support
SYSTEM	Embedded HiLinux System, stable and effective, 7 x 24h
INPUT	RJ45 GbEthernet, IPTV in SPTS and MPTS (service selection) supported, management by web browser, firmware upgrade by Web-IF
Protocol	Unicast: HTTP / adaptive HLS / FLV / RTSP/UDP / RTMP(s) / SRT: push & passphrase Multicast: UDP/RTP
Data Rates	100 kbps – 32 Mbps per stream
Resolution max:	2160p60, 1080p60, 720p and below ...
Video Decoder	h.265 (HEVC) or h.264 (AVC) in max. 4K@60fps HDR support: Dolby, HDR10, HLG, Auto CBR or VBR baseline /main /high profile
Audio Decoder	STEREO AAC/AAC+/AAC++/MP3/MP2/AC3 G711
Audio sample rates	8000/11250/22500/44100/48000Hz dep. on input codec
OSD	4 Logo (bmp's with or w/o transparent colour) and Text Insertion as transparent overlays
Picture adjust	Brightness, Hue, Saturation, Contrast
Profiles	H.264/AVC High/Main/Baseline Profile H.265/HEVC main profile MJPEG/JPEG baseline
Audio output	HDMI embedded Audio (additional 2.5mm Stereo jack out)
HDMI-max out format	3840*2160P@60/1440P@30/1080P@60/1080I@60/1080P@50/1080I@50 1080P30/1080P25/720P60/720P50/576P50/480P60 fps
CVBS Output	PAL 720x576 or NTSC 720x480
Transcoded Stream	maximum output format = 1080p@60fps
Maximum decoding Data Rate @ HDMI	1 Picture stream output: 4k@60fps @32mbps
Relative Humidity	5% to 90% non-condensing
Storage temperature	-20° to 80°C
Operating temperature	-10° to 70°C
Power supply	5-12V DC, 2A
Dimensions	105 x 100 x 24mm
Weight	240 g / incl. Package and PSU: 0,7kg
Consumption	< 5W

Companion products:

- HDE-275/Q 4x-Encoder 4K/HDMI compatible to IP Streaming
- HDE- 276/275, HDE-264/265 and SDE-265 boxed encoder series
- EMU-Encoder Streamer series
- IGA-4400 / IGA-824 IP Stream Gateways/Converters
- BTR-6000 Transcoder
- IGS-900/924/700 DVB-IP Gateways

Quickstart:

Notes and Hints:

The Ethernet-port does not support PoE so please take care of not accidentally using a PoE switch- you can damage the port and the unit will be not accessible anymore.

We recommend to use an IGMP-V2/3 protocol capable GBE- Switch to avoid flooding your network with unmanaged multicast streams. Also some consumer Internet routers do not like Multicasts (UDP/RTP) and might reboot periodically.

An Internet-connection is not necessary as long as you need to use NTP and does not have an own NTP server in your network (depending on model).

Please assure that your HDMI –Output you like to display is set to max. HD with 2160p60 or lower. Higher values will not work.

The embedded Linux system takes some seconds to fully boot. After the System-LED is on, you can connect your browser to it. We recommend Chrome, Opera, and Mozilla. Sometimes it is helpful to reload the browser – page to get the changed settings and values because of different browser behaviours... Be a little patient, while the decoder needs to react on your changed settings in some seconds.

The RESET button (RST at the front as a hole) will erase all your settings and the unit will be forced to start with factory defaults. Use a thin wire to pass the small hole and press the inside button by it for at least 5-10 seconds until the System LED will go off. The encoder would perform a restart than after releasing the button.

The Web-Interface lookalike may vary between different Versions but basically its self-explaining.

The SDI output supporting only one embedded Stereo-Audio-Pair to be processed.

Connecting:

After PSU, Output screen and no Input streams has been configured the Output screen will show a BLACK Screen with the message: No Signal and the LAN IP address of the unit.

Setting up your PC/Laptop before connecting:

If you use a Windows based PC, you should assign its Ethernet adapter into the same range like the encoder: Use a static IP like follows:

1st: Open your network settings in System Menu:



Organisieren ▾

- Ethernet IRENIS Realtek PCIe GBE Family Cont...

→

Status von Ethernet

Allgemein

Verbindung

IPv4-Konnektivität:	Internet
IPv6-Konnektivität:	Internet
Medienstatus:	Aktiviert
Dauer:	01:52:23
Übertragungsrate:	1,0 GBit/s

Details...

Aktivität

Gesendet — Empfangen

Bytes: 100.003.547 | 30.198.750

Eigenschaften Deaktivieren Diagnose

Schließen

Eigenschaften von Ethernet

Netzwerk Freigabe

Verbindung herstellen über:

Realtek PCIe GBE Family Controller

Konfigurieren...

Diese Verbindung verwendet folgende Elemente:

- Npcap Packet Driver (NPF) (Wi-Fi)
- Npcap Packet Driver (NPCAP) (Wi-Fi)
- QoS-Paketplaner
- Intel(R) Technology Access Filter Driver
- Internetprotokoll, Version 4 (TCP/IPv4)
- Microsoft-Multiplexorprotokoll für Netzwerkadapter
- Microsoft-LLDP-Treiber

Installieren... Deinstallieren Eigenschaften

Beschreibung

TCP/IP, das Standardprotokoll für WAN-Netzwerke, das den Datenaustausch über verschiedene, miteinander verbundene Netzwerke ermöglicht.

-> May be confirm Administrator access->

Eigenschaften von Internetprotokoll, Version 4 (TCP/IPv4)

Allgemein

IP-Einstellungen können automatisch zugewiesen werden, wenn das Netzwerk diese Funktion unterstützt. Wenden Sie sich andernfalls an den Netzwerkadministrator, um die geeigneten IP-Einstellungen zu beziehen.

IP-Adresse automatisch beziehen

Folgende IP-Adresse verwenden:

IP-Adresse: 192 . 168 . 1 . 103

Subnetzmaske: 255 . 255 . 255 . 0

Standardgateway: 192 . 168 . 1 . 1

DNS-Serveradresse automatisch beziehen

Folgende DNS-Serveradressen verwenden:

Bevorzugter DNS-Server: 192 . 168 . 1 . 1

Alternativer DNS-Server: 9 . 9 . 9 . 9

Einstellungen beim Beenden überprüfen

Erweitert...

OK Abbrechen

Change IPv4 settings:

And confirm please. Linux users should know how to change the ethernet or WIFI settings.

Then open your browser and enter the http- Address of the box 192.168.1.169 (w/o https):

admin / admin

Address:

Set the Input stream address, enable or disable Audio, you can adjust the cache size in ms or select the video Service from the MPTS-listing. Default – also for SPTS =Service number 1.

If there is an ONVIF Streamer in your network, it will be autodetected (like an RTSP Camera).

Example for what might not be supported:

An Input stream with 1080i50 (displayed as 1080 25fps): You might get no decoding output.

But p50 as example works like a charm:

Mixer, Audio and video CODECS, subtitles are shown.

- ▼ Stream 0
 - Original ID: 5311
 - Codec: H264 - MPEG-4 AVC (part 10) (h264)
 - Type: Video
 - Video resolution: 1280x720
 - Buffer dimensions: 1280x720
 - Frame rate: 50
 - Decoded format:
 - Orientation: Top left
 - Color primaries: ITU-R BT.709
 - Color transfer function: ITU-R BT.709
 - Color space: ITU-R BT.709 Range
 - Chroma location: Left
 - ▼ Stream 1
 - Original ID: 5312
 - Codec: MPEG Audio layer 1/2 (mpga)
 - Language: German
 - Type: Audio
 - Channels: Stereo
 - Sample rate: 48000 Hz
 - Bits per sample: 32
 - Bitrate: 192 kb/s

So we recommend to use corresponding ENCODER/STREAMER <-> DECODER values for these couples. The boxed encoder family can have interlaced inputs on HDMI or SDI and encodes in progressive streams.

As you can see with this example, the decoder can make use of the @ in the multicast address like VLC demands this mandatory.

BTW: We assume, that you are familiar with all necessary details in streaming technology and know about RTP/UDP, SRT, HTTP, FLV, RTSP, RTMP, adaptive HLS... and all related protocols as well as IGMP V2/3 filtering in your network switches!

If you aren't familiar with this, you can get an overview from our whitepaper about IPTV.

Recommendation: Using Unicast streams will secure stability of reception because UDP protocol (and also RTP) doesn't care about lost packets.

Example: Source: HD encoder:



HD Encoder System Platform
Version: 5.32

Input status

Running Time: 0000-00-00 04:22:34
Device Time: 2023-09-28 15:00:03 (Sync Time To Device)
Device Name: encoder-2
CPU Usage: 31% (If CPU usage always more than 85%, please close some stream.)
Memory Usage: 55.2M/247.6M
Input Size: 1920x1080i@50
Collected Video Frames: 393683
Lost Video Frames: 2
Audio Samplerate: 48000
Net Packet Sent: 48
Net Packet Dropped: 0

And output set to HDMI UHD resolution like:

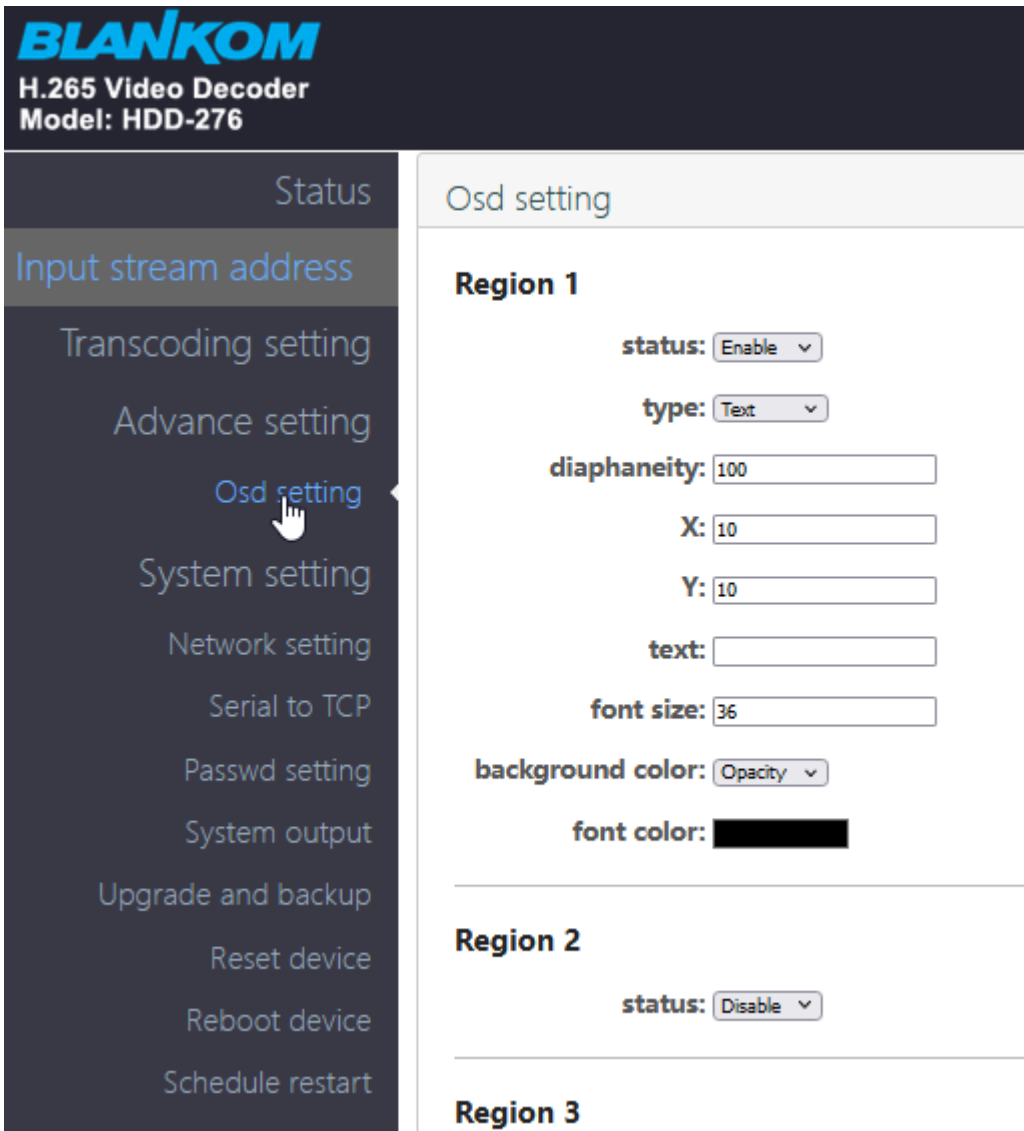
Will do it.

Here you have some options to adjust the picture.

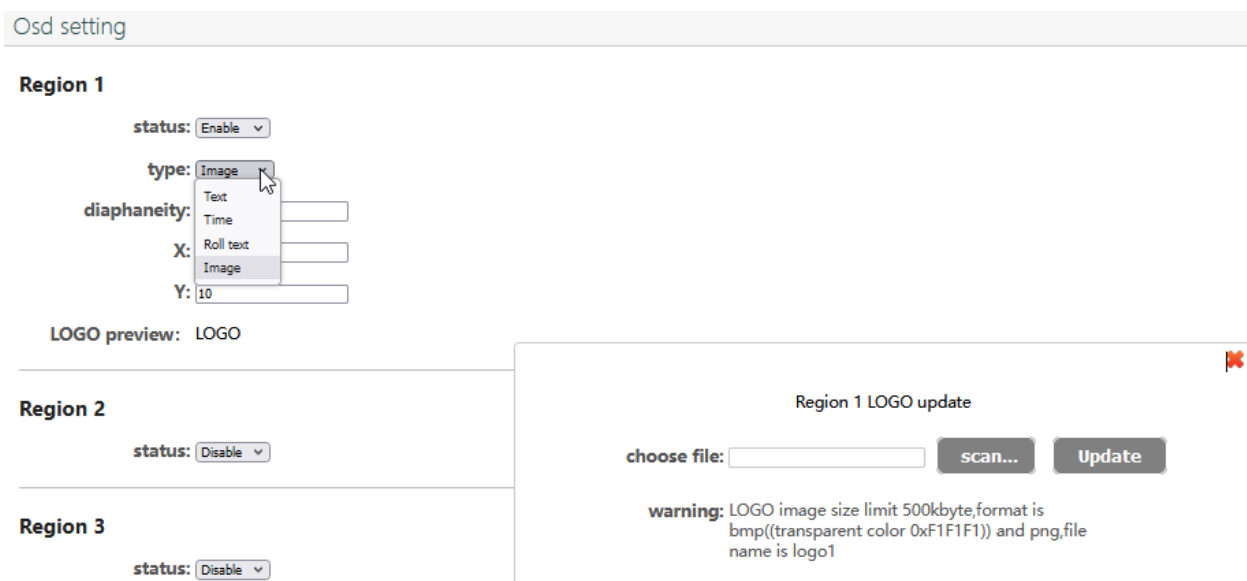
Note: For Unicast stream reception both device network IP addresses should be in the same subnet: Decoder = 192.168.1.169, streamer Ethernet = <http://192.168.1.73/0.ts> or your network routes are set proper to that streaming pathway.

Adding a Logo or text to your Output:

Up to 4 independent regions can be addresses with either LOGO, static Text or rolling Text according to:



The Logo must have special graphic values like set and upload:



Example:



IrfanView - Image properties	
File name:	logo1.bmp
Folder:	D:\Bilder\Blankom Logos\
Full path:	D:\Bilder\Blankom Logos\logo1.bmp
Compression:	None
Resolution:	200 x 200 DPI <input type="button" value="Change"/>
Original size:	355 x 354 Pixels (1:1)
Current size:	355 x 354 Pixels (1:1)
Print size (from DPI):	4.5 x 4.5 cm; 1.77 x 1.77 inches
Original colors:	16,7 Million (24 BitsPerPixel)
Current colors:	16,7 Million (24 BitsPerPixel)
Number of unique colors:	1924 <input type="checkbox"/> Auto count
Disk size:	369.26 KB (378.126 Bytes)
Current memory size:	369.25 KB (378.112 Bytes)
Current folder/list index:	69 / 107
File date/time:	10.09.2019 / 15:13:18
Loaded in:	0 milliseconds
<input type="button" value="OK"/>	

The transparent Background colour must be set to:
24-bit BMP (0xF1F1F1=transparent)

Also the file-size is limited, so do not upload too big ones. Maybe better to reduce the resolution...
->



At position and screen UHD out set like above 2160 and to position:

status:

type:

X:

Y:

LOGO preview: 

The status always gives you the status about the I/O and might be not always correct and need to be refreshed sometimes...

Status

System status

Systeamtime: 2023-09-28 14:35:53 (Synchronize time to the device)

Runtime: 0000-00-01 03:50:16

CPU usage: 40%

Memory usage: 231MB/975MB

net status: internet

Output format: 1080P25

Channel number: 1

Decode channel1

Decode address: udp://@230.1.1.1:10001

Decode status: normal

Decode type: H264

Decode size: 1920x1080

Frame rate(fps): 25

Bitrate(kbit): 3742

Backup and re-upload of Firmware and configuration files:

Show the current version and the hints for updating the firmware *if necessary and available ... ask us...*

So, if you have two identical decoder units, you can download the Firmware from the newer one (currently Version 4.1.2 with improved decoder functions is released) and upload it to the other unit. Or ask us, sent an email.

Network and password settings explain themselves as well as Reset and Reboot.

<p>Status</p> <p>Input stream address</p> <p>Transcoding setting</p> <p>Advance setting</p> <p>System setting</p> <p>Network setting</p> <p>Serial to TCP</p> <p>Passwd setting</p> <p>System output</p> <p>Upgrade and backup</p> <p>Reset device</p> <p>Reboot device</p> <p>Schedule restart</p>	<h3 style="text-align: center;">Network setting</h3> <hr/> <p>Internet access</p> <p>DHCP: <input type="button" value="Disable"/></p> <p>IP: <input type="text" value="192.168.0.198"/></p> <p>Mask: <input type="text" value="255.255.255.0"/></p> <p>Gateway: <input type="text" value="192.168.0.1"/></p> <p>Mac: <input type="text" value="48:D7:FF:01:FF:89"/></p> <hr/> <p>DNS</p> <p>Dns1: <input type="text" value="192.168.0.1"/></p> <p>Dns2: <input type="text"/></p> <hr/> <p>NTP</p> <p>NTP Enable: <input type="button" value="Disable"/></p> <p>NTP Server: <input type="text" value="time.windows.com"/></p> <p>Time Zone: <input type="button" value="UTC+1"/></p> <hr/> <p>Port</p> <p>HTTP Port: <input type="text" value="8000"/></p> <p style="text-align: center;"><input type="button" value="Apply"/></p>
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Please note the http port can be changed... We recommend to use a static IP address and not DHCP. Note: Sometimes after essential changes a reboot might help to re-adjust the unit...

Additionally, a serial over TCP port has been integrated:

Status

Input stream address

Transcoding setting

Advance setting

System setting

Network setting

Serial to TCP

Passwd setting

Serial to TCP

Mode: Client ▾

Baud Rate: 9600 ▾

Server Address: 192.168.1.168

Server Port: 5150

Apply

This can correspond with the serial-tcp feature of our encoders but need extra hardware (TCP-Serial-Interfaces)

SRT-support corresponding with encoder/decoder couple:

Support h264 & h265 with its playout url as

Srt://ip:port // encoder as Listener, decoder get srt from encoder, here 'ip' is the Encoder IP.

srt://port or **srt://@port** // encoder mode as caller, push srt to the decoder.

with passphrase/Encryption, its play url

srt://passphrase@ip:port // encoder as Listener, decoder get srt from encoder, here 'ip' is the

Encoder IP. **srt://passphrase@port** // encoder mode as caller, push srt to the decoder.

The screenshot displays the configuration interface for a 4K Decoder (H.265/H.264). The interface is divided into several sections:

- Encoding Settings (Left Panel):**
 - Encoding type: H.264
 - FFS: 30 [5-60]
 - GOP: 30 [5-300]
 - Bitrate (kbit/s): 1800 [32-32000]
 - Encoded size: 1280x720
 - H.264 Level: high profile
 - Bitrate control: vbr
 - TS URL: /1 ts (Enable)
 - M3U URL: /1 m3u8 (Disable)
 - FLV URL: /1 flv (Disable)
 - RTSP URL: /1 (Disable)
 - RTMP URL: /1 (Disable)
 - RTMP (S)/RTSP PUSH URL: rtmp://192.168.1.50/live/1 (Disable)
 - Multicast IP: 238.0.0.1 (Disable)
 - Multicast port: 1235 [1-65535]
 - SRT URL Port: 9001 (Enable) [1-65535]
 - SRT PUSH URL: srt://192.168.1.169-9001 (Enable)
 - SRT Encryption Password: 0123456789 (Enable)
- 4K Decoder H.265/H.264 (Center Panel):**
 - Status
 - Address setting
 - Advance setting
 - System setting
- Status (Right Panel):**
 - System status:** runtime: 0000-00-00 00:15:40, cpu usage: 7%, mem usage: 52MB/253MB, output format: 1080P50, decode wndnum: 4
 - Channel1:** addr: srt://192.168.1.170-9000, status: normal, frame rate (fps): 25, code rate (kbit/s): 2031
 - Channel2:** addr: srt://@9000, status: normal, frame rate (fps): 25, code rate (kbit/s): 813
 - Channel3:** addr: srt://0123456789@192.168.1.170-9001, status: normal, frame rate (fps): 30, code rate (kbit/s): 527
 - Channel4:** addr: srt://0123456789@9001, status: normal, frame rate (fps): 30, code rate (kbit/s): 497

MPTS stream reception and decoding:

Example, stream reception of an MPTS coming from a SAT streamer and selecting the Program number for decoding means it demultiplex an MPTS (FTA) and the selected Program will be displayed on TV:

This is the original Stream content: (3 FTA, 2 encrypted – non decodable)

The screenshot shows a software interface for MPTS stream reception. The top section includes settings for Mode (MPEG-TS), ATSC 3.0, and Input Adapter (3: IP (Local IP: 192.168.1.205)). The URL is set to `udp://239.1.1.115:10150`. Below this, there are two main panels: 'PID info (48)' and 'Transport stream 1002'. The 'PID info' panel lists various PID streams such as PAT, CAT, NIT, SDT, EIT, TDT, SCTE, PMT, and video/audio streams. The 'Transport stream 1002' panel shows a list of services including BBC World News Europe HD, AC-3 Audio, and NHK WORLD-JPN. A 'Trace bar' window is also visible, showing a bit-rate graph for TR 101 290.

Compared with VLC PC reception: and set the Program 4 for decoding in the HDD-275:

The screenshot shows the VLC media player interface. The 'Address setting' tab is active, showing 'Decode wndnum: 1' and 'Channel1Addr: udp://239.1.1.115:10150'. The 'Program Id' is set to 'Program 4'. Below this, the 'Current Media Information' window is open, displaying details for three streams: Stream 0 (H.264 - MPEG-4 AVC), Stream 1 (A52 Audio), and Stream 2 (MPEG Audio layer 1/2). The video player shows a landscape scene with a volcano.

Put the NHK HD-Service on the TV incl. Audio.

The Program number (1...32) to be selected in the web-if (here NHK=4) must not be the same like in the DVB-MPTS-stream so try and error recommended.

Be patient, the decoder need seconds to react when switching. **Note: Not all DVB-TV-Resolutions/Codecs and Hz/framerates are supported for decoding (Example: Audio in MP2).**

Factory Settings:

The screenshot displays the BLANKOM web interface. On the left, a dark sidebar contains a list of menu items: Status, Input stream address, Transcoding setting, Advance setting, System setting, Network setting, Serial to TCP, Passwd setting, System output, Upgrade and backup, and Reset device. The 'Reset device' item is highlighted with a white arrow pointing to it. The main content area on the right has a light gray header 'Reset device'. Below this header, the text 'Reset system:' is followed by a dark gray button labeled 'Reset'. A mouse cursor is visible over the 'Reset' button.

Example to connect a RTMP-Source to the Decoder:

Streamer is a HDE-275Q here with 4K p30: Please note: RTMP almost **only supports h.264** codec (Thanks to Adobe – the original RTMP inventor).

IP Address of the streamer: 192.168.1.167:

⚠ Nicht sicher | 192.168.1.167/en/OutputP1MainE.html

The screenshot displays the configuration interface for the BLANKOM HD Encoder System Platform 5.05. The 'Main Stream' section is active, showing the following settings:

- Encoding Type: H.264
- FPS: 30 [5-60]
- GOP: 15 [5-300]
- Bitrate(kbit): 10000 [32-32000]
- Encoded Size: same as the input
- H.264 Level: baseline profile
- Bitrate Control: vbr
- TS URL: /0.ts [Enable]
- HLS URL: /0.m3u8 [Disable]
- FLV URL: /0.flv [Disable]
- RTSP URL: /0 [Disable]
- RTMP URL: /0 [Disable]
- RTMP(S)/RTSP PUSH URL: rtmp://192.168.1.169/live/0 [Enable]
- Multicast IP: 238.0.0.1 [Enable]
- Multicast Port: 12340 [1-65535]
- SRT URL Port: 9000 [Disable] [1-65535]
- SRT PUSH URL: srt://192.168.1.50:9000 [Disable]
- SRT Encryption Password: 0123456789 [Disable]

It's the same procedure like with the HDD-275 Decoder: The following example screenshots are from HDD-275.

Here no username/password is set and the RTMP-Push URL is the address of the Decoder:

rtmp://192.168.1.169/live/0

The streamer will show if both are connected:

Nicht sicher | 192.168.1.167/en/indexE.html

Because we have to setup the Decoder Address-Field to its own push – address given from the source:

Check Status Window of the decoder:

BLANKOM
H.265 Video Decoder
Model: HDD-275

Status

Address setting
Advance setting
System setting
Network setting
Serial to TCP
Passwd setting
System output
Factory setting
Upgrade & Backup
Reset device

Status

System status

Device Time: 2023-01-31 13:33:58 (Sync time to device)
Runtime: 0000-00-00 00:22:20
CPU usage: 24%
MEM usage: 35MB/253MB
Net status: local
HDMI format: 3840x2160_30
Channel number: 1

Channel1

URL: rtmp://192.168.1.169/live/0
Status: normal
Frame rate(fps): 30
Bit rate(kbit/s): 8133

So, if you want to use h.265 encoded streams, do not use RTMP ;-).

Please check also our online chapter TUTORIALS:

<https://www.blankom.de/tutorials.html>

<https://www.blankom.de/anleitungen-deutsch.html>

you will find a lot of needful information about Video, encoding, streaming and decoding.

Finally some essential information about streams:

Recommendation: Video streaming Multicast addresses should be setup according to the IANNA recommendations skipping reserved addresses like in the ranges of the 239.x.y.z: 10000 and IP addresses should be different like counting 239.1.1.1 ... 239.1.1.2 As well as the Port numbers too (> 10000, 10001, 10002, 10003,)

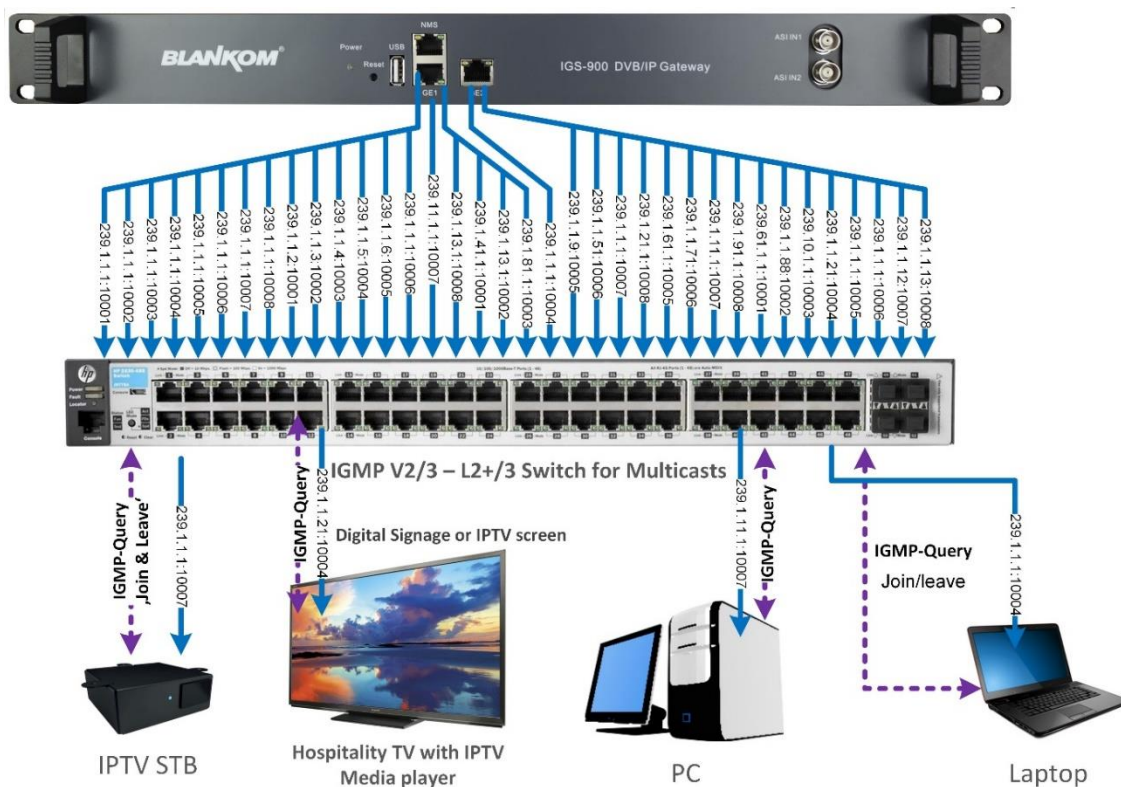
Note: We usually are not offering the network equipment for the projects because our partners -the local system- integrators- are almost serving this.

So highly recommendation for multicasts: IGMP is the key. Many STB's or TV sets have only 100BaseT Ethernet RJ45 and the Headend streams are almost in total up to 850-max 920 Mb/s so Gigabit-ports. If they would get all streams they will be overloaded. Example with 2 GbE output, 200 Streams with an average of 6-8 Mb/s (SD and HD TV Services mixed) = 1,4Gbit /s as streams.

What is IGMP Querying

and IGMP Snooping and why would I need it on my network?

IGMP is a network layer (Layer 3) protocol used to establish membership in a Multicast group and can register a router to receive specific Multicast traffic. (Refer to RFC 1112 and RFC 2236 for information on IGMP versions 2 and 3). Multicast aware switches are slowly making their way into the network cores for businesses and universities that have heavy traffic to move through their networks. Multicast filtering is achieved by dynamic group control management. By default, all Multicast traffic should be blocked until requested by a Multicast group member. (Default behaviour depends on switch manufacturer.) **The master of the IGMP filter lists is the router or switch that is configured to act as the IGMP Query.** The responsibility of the Query is to send out IGMP group membership queries on a timed interval, to retrieve IGMP membership reports from active members, and to allow updating of the group membership tables. A **Layer 2** switch supporting IGMP Snooping can **passively snoop** on IGMP Query, Report, and Leave (IGMP version 2) packets transferred between IP Multicast routers/switches and IP Multicast hosts to determine the IP Multicast group membership. IGMP snooping checks IGMP packets passing through the network, picks out the group registration, and configures Multicasting accordingly. See illustration:



Without IGMP Querying/Snooping, Multicast traffic is treated in the same manner as a Broadcast transmission, which forwards packets to all ports on the network. With IGMP Querying/Snooping, Multicast traffic is only forwarded to ports that are members of that Multicast group. IGMP Snooping generates no additional network traffic, which significantly reduces the Multicast traffic passing through your switch.

If your network distribution core does not support IGMP Querying/Snooping, the AVN streams will still function as designed but your network may be subjected to high traffic loads and condensed collision domain due to the broadcasting action used by the older switch or hub. If this is the case, you may wish to isolate the streaming nodes within the network so that the streams may be viewed without crossing the normal network traffic along its path.

Recommendation: Not only Snooping but IGMP V2 or V3 switches with Layer2+ (the + stand for extra features like IGMP full support) so better Layer 3 is the best solution.

IPv4 Multicast Address Space Registry

Last Updated

2018-01-05


Expert(s)

Stig Venaas

Note

Host Extensions for IP Multicasting [[RFC1112](#)] specifies the extensions required of a host implementation of the Internet Protocol (IP) to support multicasting. The multicast addresses are in the range 224.0.0.0 through 239.255.255.255. Address assignments are listed below.

The range of addresses between 224.0.0.0 and 224.0.0.255, inclusive, is reserved for the use of routing protocols and other low-level topology discovery or maintenance protocols, such as gateway discovery and group membership reporting. Multicast routers should not forward any multicast datagram with destination addresses in this range, regardless of its TTL.

Available Formats  [XML](#)  [HTML](#)  [Plain text](#)
Registries included below

- [Local Network Control Block \(224.0.0.0 - 224.0.0.255 \(224.0.0/24\)\)](#)
- [Internetwork Control Block \(224.0.1.0 - 224.0.1.255 \(224.0.1/24\)\)](#)
- [AD-HOC Block I \(224.0.2.0 - 224.0.255.255\)](#)
- [RESERVED \(224.1.0.0-224.1.255.255 \(224.1/16\)\)](#)
- [SDP/SAP Block \(224.2.0.0-224.2.255.255 \(224.2/16\)\)](#)
- [AD-HOC Block II \(224.3.0.0-224.4.255.255 \(224.3/16, 224.4/16\)\)](#)
- [RESERVED \(224.5.0.0-224.251.255.255 \(251 /16s\)\)](#)
- [DIS Transient Groups 224.252.0.0-224.255.255.255 \(224.252/14\)\)](#)
- [RESERVED \(225.0.0.0-231.255.255.255 \(7 /8s\)\)](#)
- [Source-Specific Multicast Block \(232.0.0.0-232.255.255.255 \(232/8\)\)](#)
- [GLOP Block](#)
- [AD-HOC Block III \(233.252.0.0-233.255.255.255 \(233.252/14\)\)](#)
- [Unicast-Prefix-based IPv4 Multicast Addresses](#)
- [Scoped Multicast Ranges](#)
- [Relative Addresses used with Scoped Multicast Addresses](#)

Multicast (as opposed to unicast) is used to send UDP packets from 1 source to multiple destination servers. This is useful for example for streaming from a satellite/DVB-T receiver to multiple receiving PCs for playback. Multicast can also be used on the output of an encoder to

feed multiple streaming servers. Multicast only works with UDP and is not possible with TCP due to the 2 way nature of TCP, most commonly multicast is used with RTP and MPEG2-TS.

A multicast IP address must be chosen according to IANA information, we recommend using an address in the range **239.0.0.0 to 239.255.255.255** as this is reserved for private use. Using multicast addresses in the 224.0.0.0 range may clash with existing services and cause your stream to fail. For more details see <http://www.iana.org/assignments/multicast-addresses/multicast-addresses.xml>

Choosing a UDP port number for multicast streams is also important. Even if you use a different multicast IP for each of your streams, we strongly recommend using different UDP port numbers as well. This is because a server and all software running on the server receives ALL multicast traffic on an open port and extra processing is required to filter out the required traffic. If the each stream arrives on a different port, the server can safely ignore any traffic on ports that are not open. Port numbers MUST be chosen so that don't clash with any existing services or ephemeral ranges. The ephemeral range for Windows Vista, 7, 2008 is 49152 to 65535, for older Windows it is 1025 to 5000 and for Linux it is 32768 to 61000. For more information on Windows see <http://support.microsoft.com/kb/929851> Care should also be taken to avoid system ports 0 to 1024. See <http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml> Generally one of the unassigned You Ports (**1024-49151**) should be used, you can run the **netstat -abn** (as admin under windows) command to see which ports are currently in use.

Registered port

A **registered port** is a [network port](#) (a sub-address defined within the [Internet Protocol](#), in the range 1024–49151) assigned by the [Internet Assigned Numbers Authority](#) (IANA) (or by [Internet Corporation for Assigned Names and Numbers](#) (ICANN) before March 21, 2001,^[1] or by USC/ISI before 1998) for use with a certain protocol or application.

Ports with numbers 0–1023 are called *system or well-known ports*; ports with numbers 1024–49151 are called *you or registered ports*, and ports with numbers 49152–65535 are called *dynamic and/or private ports*.^[2] Both system and you ports are used by transport protocols (TCP, UDP, DCCP, SCTP) to indicate an application or service.

- **Ports 1024–49151** – you or registered ports
- **Ports >49151** – dynamic / private ports

https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers

Range for Ephemeral port

The [Internet Assigned Numbers Authority](#) (IANA) suggests the range 49152 to 65535 ($2^{15}+2^{14}$ to $2^{16}-1$) for dynamic or private ports.^[1]

Many [Linux kernels](#) use the port range 32768 to 61000.^[note 2] [FreeBSD](#) has used the IANA port range since release 4.6. Previous versions, including the [Berkeley Software Distribution](#) (BSD), use ports 1024 to 5000 as ephemeral ports.^{[2][3]}

[Microsoft Windows](#) operating systems through XP use the range 1025–5000 as ephemeral ports by default.^[4] [Windows Vista](#), [Windows 7](#), and [Server 2008](#) use the IANA range by default.^[5] [Windows Server 2003](#) uses the range 1025–5000 by default, until Microsoft security update MS08-037 from 2008 is installed, after which it uses the IANA range by default.^[6] Windows Server 2008 with Exchange Server 2007 installed has a default port range of 1025–60000.^[7] In addition to the default range, all versions of Windows since Windows 2000 have the option of specifying a custom range anywhere within 1025–65535.^{[8][9]}

Packet structure

		UDP Header																															
Offsets	Octet	0				1				2				3																			
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Source port																Destination port															
4	32	Length																Checksum															

The UDP header consists of 4 fields, each of which is 2 bytes (16 bits).^[4] The use of the fields "Checksum" and "Source port" is optional in IPv4 (pink background in table). In IPv6 only the source port is optional (see below).

Source port number

This field identifies the sender's port when meaningful and should be assumed to be the port to reply to if needed. If not used, then it should be zero. If the source host is the client, the port number is likely to be an ephemeral port number. If the source host is the server, the port number is likely to be a well-known port number.^[4]

Destination port number

This field identifies the receiver's port and is required. Similar to source port number, if the client is the destination host then the port number will likely be an ephemeral port number and if the destination host is the server then the port number will likely be a well-known port number.^[4]

Length

A field that specifies the length in bytes of the UDP header and UDP data. The minimum length is 8 bytes because that is the length of the header. The field size sets a theoretical limit of 65,535 bytes (8 byte header + 65,527 bytes of data) for a UDP datagram. However the actual limit for the data length, which is imposed by the underlying IPv4 protocol, is 65,507 bytes (65,535 – 8 byte UDP header – 20 byte IP header).^[4]

In IPv6 [jumbograms](#) it is possible to have UDP packets of size greater than 65,535 bytes.^[5] RFC 2675 specifies that the length field is set to zero if the length of the UDP header plus UDP data is greater than 65,535.

Checksum

The [checksum](#) field may be used for error-checking of the header and data. This field is optional in IPv4, and mandatory in IPv6.^[6] The field carries all-zeros if unused.^[7]

RTP:

apart from: <https://tools.ietf.org/html/rfc3550>

Chapter 11:

RTP relies on the underlying protocol(s) to provide demultiplexing of RTP data and RTCP control streams. For UDP and similar protocols,

RTP SHOULD use an even destination port number and the corresponding RTCP stream SHOULD use the next higher (odd) destination port number.

For applications that take a single port number as a parameter and derive the RTP and RTCP port pair from that number, if an odd number is supplied then the application SHOULD replace that number with the next lower (even) number to use as the base of the port pair. For applications in which the RTP and RTCP destination port numbers are specified via explicit, separate parameters (using a signalling protocol or other means), the application MAY disregard the restrictions that the port numbers be even/odd and consecutive although the use of an even/odd port pair is still encouraged. The RTP and RTCP port numbers MUST NOT be the same since RTP relies on the port numbers to de-multiplex the RTP data and RTCP control streams.

In a unicast session, both participants need to identify a port pair for receiving RTP and RTCP packets. Both participants MAY use the same port pair. A participant MUST NOT assume that the source port of the incoming RTP or RTCP packet can be used as the destination port for outgoing RTP or RTCP packets. When RTP data packets are being sent in both directions, each participant's RTCP SR packets MUST be sent to the port that the other participant has specified for reception of RTCP. The RTCP SR packets combine sender information for the outgoing data plus reception report information for the incoming data. If a side is not actively sending data (see [Section 6.4](#)), an RTCP RR packet is sent instead.

Anmerkung:

Alle von uns veröffentlichten Betriebsanleitungen richten sich an den Antennen- und IT-Fachmann, der über grundlegende Kenntnisse der Empfangs-, Netzwerk- und Anlagentechnik verfügt. Die Einhaltung aller relevanten Vorschriften und Richtlinien für den Aufbau und Betrieb von solchen Anlagen obliegt dem Installateur und/oder dem Betreiber. Insbesondere sind die in den jeweiligen Ländern geltenden Vorschriften und Richtlinien für die Inbetriebnahme speziell für den Stromanschluss und alle mit den Produkten in Zusammenhang stehenden und geltenden Normen und Gesetze einzuhalten.

Remark:

All operating instructions published by us are intended for the antenna and IT specialist who has basic knowledge of reception, network and system technology. Compliance with all relevant regulations and guidelines for the installation and operation of such systems is the responsibility of the installer and/or the operator. In particular, the regulations and guidelines applicable in the respective countries for commissioning, especially for the power connection, and all standards and laws related to the products must be complied with.

Annotation:

Tous les modes d'emploi que nous publions sont destinés aux professionnels de l'antenne et de l'informatique qui ont des connaissances de base en matière de réception, de mise en réseau et de technologie des équipements. Le respect de toutes les réglementations et directives pertinentes pour l'installation et l'exploitation de ces systèmes relève de la responsabilité de l'installateur et/ou de l'exploitant. En particulier, il convient de respecter les réglementations et directives applicables dans les pays respectifs pour la mise en service, notamment pour le raccordement électrique, ainsi que toutes les normes et lois relatives aux produits.

Annotazione:

Tutte le istruzioni per l'uso da noi pubblicate sono destinate al professionista dell'antenna e dell'informatica che ha una conoscenza di base della tecnologia di ricezione, di rete e delle apparecchiature. Il rispetto di tutti i regolamenti e le linee guida pertinenti per l'installazione e il funzionamento di tali sistemi è responsabilità dell'installatore e/o dell'operatore. In particolare, devono essere rispettati i regolamenti e le linee guida applicabili nei rispettivi paesi per la messa in funzione, soprattutto per il collegamento alla rete elettrica e tutte le norme e le leggi relative ai prodotti.

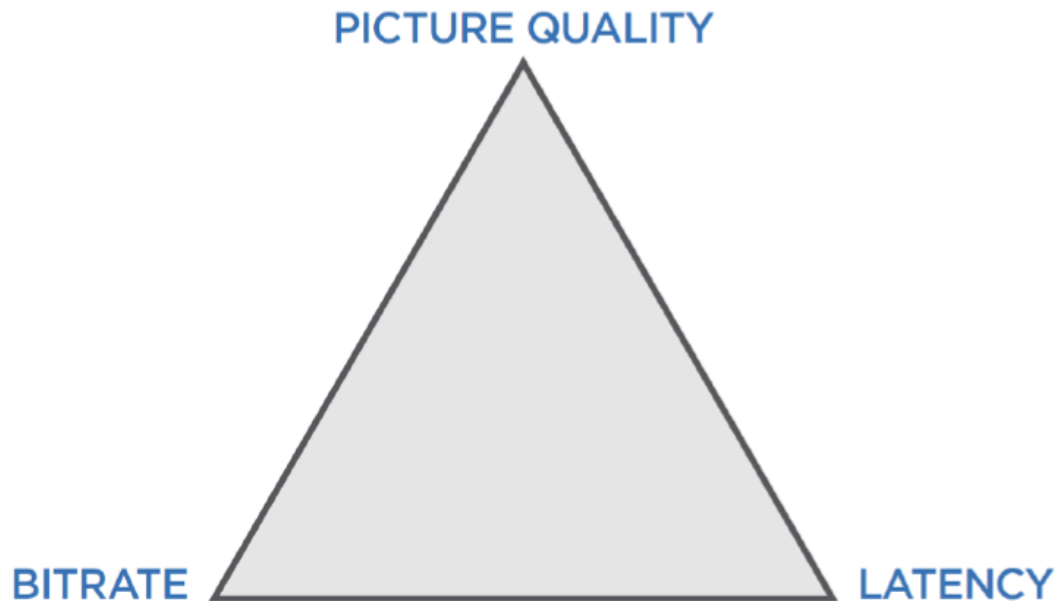
Anotación:

Todas las instrucciones de uso publicadas por nosotros se dirigen al profesional de la antena y de la informática que tiene conocimientos básicos de recepción, de redes y de tecnología de equipos. El cumplimiento de todos los reglamentos y directrices pertinentes para la instalación y el funcionamiento de dichos sistemas es responsabilidad del instalador y/o del operador. En particular, deben cumplirse los reglamentos y directrices aplicables en los respectivos países para la puesta en marcha, especialmente para la conexión de la energía y todas las normas y leyes relacionadas con los productos.

Anotação:

Todas as instruções de operação publicadas por nós são destinadas ao profissional de antena e TI que possui conhecimentos básicos de recepção, rede e tecnologia de equipamentos. O cumprimento de todos os regulamentos e diretrizes relevantes para a instalação e operação de tais sistemas é de responsabilidade do instalador e/ou do operador. Em particular, os regulamentos e diretrizes aplicáveis nos respectivos países para comissionamento, especialmente para a conexão de energia e todas as normas e leis relacionadas aos produtos devem ser obedecidas.

Balancing Latency with Picture Quality and Bandwidth Availability



Balancing Bitrate, Latency, and Picture Quality

These three factors need to be taken into consideration when encoding and streaming live content.

Any video encoder used for broadcast quality live video streaming should allow users to change bitrate, picture quality, and latency settings. Ultimately, the individual targeted use case will determine the best balance within this triangle of video encoding and streaming considerations.

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